

Total No. of Questions—8]

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**[5057]-252****S.E. (Computer) (First Semester) EXAMINATION, 2016****DATA STRUCTURE AND PROBLEM SOLVING****(2012 PATTERN)****Time : Two Hours****Maximum Marks : 50**

- N.B. :—**
- (i) Attempt Q. No. 1 or Q. No. 2, Q. No. 3 or Q. No. 4, Q. No. 5 or Q. No. 6, Q. No. 7 or Q. No. 8.
  - (ii) Neat diagrams must be drawn wherever necessary.
  - (iii) Figures to the right indicate full marks.
  - (iv) Use of non-programable electronic pocket calculator and steam tables is allowed.
  - (v) Assume suitable data, if necessary.

1. (a) Explain big-oh, omega and theta notation with example. [4]
- (b) Sort the following numbers using quick sort :  
44, 75, 23, 43, 55, 12, 64, 77, 33.  
State its time complexity and space complexity. [4]
- (c) Explain an algorithm of Merge Sort with suitable example. [4]

*Or*

2. (a) Explain circular queue using link list. Write C code for enqueue operation. [4]

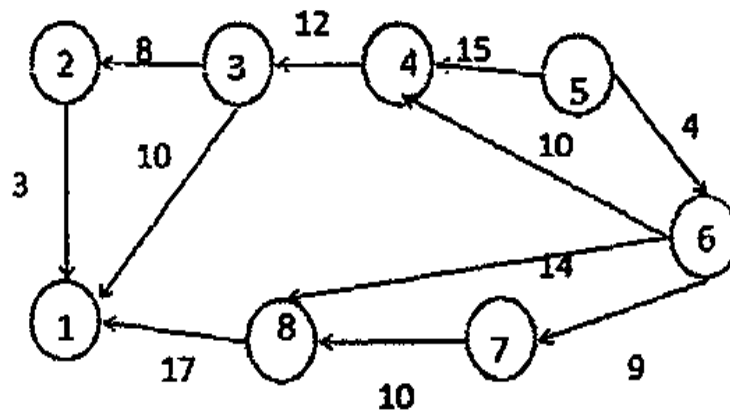
P.T.O.

- (b) Suppose character a, b, c, d, e, f have probabilities 0.7, 0.9, 0.12, 0.22, 0.23, 0.27 respectively. Find optimal huffman code and draw huffman tree. What is the average code length ? [8]

3. (a) Explain the following terms of the below given graph :

(i) In degree of and out degree of each vertex.

(ii) Adjancy list representation. [4]



(b) Explain the algorithm for depth first search for graph. [4]

(c) What is Threaded Binary Tree (TBT) ? Explain the TBT for in order and pre-order traversal. [5]

Or

4. (a) Construct the AVL tree for the following data by inserting each data item one at a time 3, 2, 1, 4, 5, 6, 7, 16, 15, 14. [6]

- (b) What is OBST ? List binary search tree with three words  
(w1, w2, w3) = (do, if, stop) words occur with probabilities  
(p1, p2, p3) = (0.4, 0.5, 0.1). Find the expected access time  
in each case. [7]
5. (a) Create B-tree of order 4 for the following data : [6]  
5, 3, 21, 9, 1, 13, 2, 7, 10, 12, 4, 8, 2, 21, 10.
- (b) What is Max Heap ? Sort the following data in ascending  
order using Heap Sort 15, 19, 10, 7, 17, 16. [7]
- Or*
6. (a) What is B+ Tree. Construct B+ tree of order 4 for the following  
data : [5]  
4, 7, 10, 17, 21, 31, 25, 19, 20, 28, 42.
- (b) Explain Quadratic probing and rehashing with a suitable  
example. [4]
- (c) Discuss the following operation on sequential file with  
their basic primitives in c Creation, Reading, Insertion,  
Deletion. [4]
7. (a) Calculate prefix sum of given list using pointer jumping : [4]  
(5, 3, 2, 7, - 4, 5).

- (b) Consider the input as given below, calculate rank of each node. [4]

3	4	1	2	-1	0	←
A[0]	A[1]	A[2]	A[3]	A[4]	A[5]	

- (c) Explain the various models used for parallel computation. [4]

*Or*

8. (a) Explain Odd even merge sort with a suitable example. [4]  
 (b) Write parallel algorithm to perform the addition of given number using complete binary tree method. Solve the following example 8, 4, -3, 2 for addition using complete binary tree. [8]

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